Revisiting publications on innovation in Brazilian operations management journals

Aline Dresch, Flavio Issao Kubota, and Paulo A. Cauchick Miguel

Production and System Engineering Department, Federal University of Santa Catarina, Campus Universitário Trindade, Caixa Postal 476, 88040-970 Florianópolis, SC, Brazil
paulo.cauchick@ufsc.br

Abstract
This study analyzed publications on innovation subject. Peer-reviewed articles were retrieved from 26 Brazilian operations management journals. Some papers' characteristics were identified such as the type and the level of innovation (incremental or radical). Potential opportunities for further research were also raised considering the context of an emerging economy.

Keywords: innovation, operations management, literature review.

Introduction

Innovation has been considered a significant subject for companies' growing and success, regardless of their size. Thus, keeping a systematic and continuous innovation process is a prerequisite for organizations face the current competitive environment. Davila et al. (2007) argue that innovation is crucial to ensure proper business growth in order to increase revenues as well as increasing profit. Furthermore, not all innovations are generated in the same way.

Innovation management is a critical activity for all companies because it supports the strategic direction, guides the resources allocation, provide sustainability to business, create new capabilities and generate new knowledge, making enterprises more competitive (Cooper et al., 2001). As enterprises are increasingly concerned with introducing innovative solutions, many researchers are engaged in this subject. This concern stems from the need to develop relevant research that in fact may contribute for industry growing and strengthening in emerging countries. In Brazil, national companies initially imitated foreigners and then adapted the products to the local market (Nascimento et al., 2008). It is in this context that this study is based on. Its purpose is to analyze which are the main aspects regarding innovation dealt in Brazilian journals. This work is an update of a previous study developed by Kubota and Cauchick Miguel (2013). To perform the analysis presented in this paper, aspects related to innovation nature and innovation object were considered. This paper is structured as follows: section 2 presents the theoretical basis to develop the study. Section 3 shows the research methods adopted to conduct the research. Section 4 presents results and discussion and, finally, section 5 points out conclusions, limitations and opportunities to upcoming research.

Theoretical framework

Currently, innovation is considered a factor that favors companies' competitiveness in various sectors, both goods and services businesses (Galhardi and Zacarelli, 2005). Schumpeter (1982) argued that organizations would use technology to achieve diverse competitive advantages launching a new product or service, or even changing the way a particular product was produced. According to management scholars, innovation capability is the most important determinant of firm performance (Mone et al., 1998). Innovation is widely regarded as a critical source of competitive advantage in an increasingly changing environment (Crossan and Apaydin, 2010; Dess and Picken, 2000; Tushman and O'Reilly, 1996). Over the past years, researchers and industrialists have recognized the need for and the importance of developing approaches to enhance competitive advantage in new product development (Cormican and O'Sullivan, 2004).

Innovation can be understood as a result of a systematic and organized process that transforms new ideas into successful elements. The procedure for generating innovations can be considered a complex process encompassing a number of risks that needs proper management. This process involves three main steps (Bessant and Tidd, 2009): generation of new ideas, good ideas selection, and selected ideas implementation. Corroborating it, Biancolino et al. (2013) argue that innovation is an implementation of new products, services, production methods, processes, raw materials, marketing methods, organization and market structures.

However, innovation in part depends on ability to identify new ways of producing as well as capacity to gain competitive advantage in nowadays market. Goffin and Mitchell (2010) address several common attributes: what is changed (product or process), how much is changed (completely new or just perceived as such), source of change (technology) and influence of change (social or commercial value).

The Oslo's Manual (1997) highlights that public policy structure should focus on innovation and technological development. Technological change, in turn, results from innovative activities and to performing innovative activities, investments such as R&D is needed, since it creates opportunities for higher investment in productive capabilities. Oslo's Manual (1997) also explains some categories that can be made on innovation logic. Regarding innovation typologies, the manual defines product, process, organizational and marketing innovation as follows (Oslo Manual, 1997, p. 57-63): "product innovation", "process innovation", "marketing innovation", and "organizational innovation". Furthermore, another categorization is presented in Oslo's Manual (1997) related to innovation level developed by companies: radical (or disruptive) or incremental innovation. In addition, other authors (e.g. Davila et al., 2007) present semi-radical innovation. Radical innovation regards a high impact in a market segment or in specific activities in this market (Davila et al., 2007; Oslo Manual, 1997). Incremental innovation, in turn, consists of small changes that bring improvements in an existent product/process/service (Davila et al., 2007; Barraza, 2013). This innovation typology (incremental) can also be defined as a reconfiguration of something that is adapted for use in any other context or purpose (Oslo Manual, 1997). Lastly, semi-radical innovation consists of significant changes in business strategic points, often considered as long-term projects (Davila et al., 2007).

Although innovation has been studied extensively in recent years, and an unrestricted search of academic publications using *innovation* as keyword generates thousands of articles, reviews and meta-analyses are still rare and narrowly focused, either around the analysis dimension (individual, group, firm, industry, consumer group, region and nation) or the type of innovation (product, process, organizational and marketing) (Crossan and Apaydin, 2010). Therefore, this

paper investigates the innovation topic through a literature review and analysis of publications in Brazilian operations management journals. However, the present paper specifically updates and amplifies the analysis of Kubota and Cauchick Miguel (2013), since more Brazilian journals and more papers were considered. Next section presents the research methods used to conduct the present study.

Research methods

This paper was conducted through a theoretical-conceptual approach, based on a literature review. For fulfilling the study's purpose, national journals related to the management area (operations management in particular) were analyzed. The main criteria considered to perform papers selection was considering national journals that maintain a certain relationship with operations management topics. Next, database of each selected journal were consulted, searching the keyword "innovation" in papers' titles, abstracts and keywords. Analyzed journals and respective total and selected papers are presented in Table 1.

Table 1 shows that 26 journals were identified. As mentioned before, a search for the keyword "innovation" in title, abstract and keywords was conducted in each database. After this search, 664 papers were retrieved. However, a convergence analysis was needed to ensure that these studies were in fact regarding innovation. All abstracts were read for assuring convergence. One-hundred and twenty nine papers not specifically concerned innovation, although the word "innovation" appeared in some sections of these papers. Actually, the citation of the term was secondary or less important relevance for the study. At the end, 535 papers were selected for the next step, in which all full papers were read.

Papers reading were conducted in an inspectional and analytical way in order to enable a more dynamic and assertive papers evaluation. Inspectional reading aims to make a superficial reading to identify if the article (or part of it) deserve more attention later (Adler, 1947). Then, an analytical reading was carried out. Analytical reading intends to understand the contents more deeply as well as some meanings and important points of a text (Adler, 1947). After inspectional and analytical readings, it was possible to identify which was the innovation object addressed by paper. In this sense, papers were analyzed according to the following categories: (i) product; (ii) process; (iii) organizational; and (iv) marketing. These categories were based on criteria presented in Oslo's Manual (OECD, 2005, p. 16-17, 48-49). Subsequently, papers were classified according to innovation's novelty degree according to Clark and Wheelwright (1992). Thus, articles were analyzed into: (i) radical; (ii) incremental; and (iii) semi-radical.

After reading and categorizing, the authors organized the results that provided raw data for analyzing which types and degrees of novelty excelled on innovation articles published in Brazilian journals. Accordingly, next section presents results from this research with an analysis of this information.

Results and discussion

Firstly, a descriptive analysis shows the number of papers published during the period from 1979 to 2013. One can observe that innovation is a topic that has become increasingly important for Brazilian researchers. Figure 1 illustrates the growing of publications on innovation in Brazilian journals since 1979 (year of the first publication found). It also shows that the amount of publications on innovation during the 1980 and 1990 decades were almost not relevant.

However, from the year 2000 publications increased significantly, demonstrating a greater commitment of researchers to conduct and spread research on innovation topic. Another analysis refers to number or innovation papers by journal. One can point out that three journals did not present any publication strongly related to innovation: Brazilian Administration Review (BAR), *Pesquisa Operacional* (Operational Research) and *Estudos em Design* (Studies in Design). On the other hand, *Revista de Administração e Inovação* (RAI), *Revista Brasileira de Inovação* and RAUSP were the journals with most publications addressed regarding innovation. Figure 2 shows these results.

Table 1 – Publications by journal.

Brazilian Journals	**Total papers**	**Selected**
BAR - Brazilian Administration Review	0	0
BBR - Brazilian Business Review	5	5
Estudos em Design	1	0
Gestão e Planejamento	10	9
Gestão e Produção	53	41
Organizações e Sociedade	17	13
Pesquisa Operacional	2	0
Produção	36	31
Produção Online	25	22
Produto e Produção	11	7
RAC - Revista da Administração Contemporânea	44	30
RAC Eletrônica	2	2
RAE – Revista de Administração de Empresas	15	12
RAI - Revista de Administração e Inovação	123	110
RAUSP	69	51
Revista Brasileira de Gestão de Negócios	8	7
Revista Brasileira de Inovação	87	66
Revista de Administração Mackenzie – RAM	8	6
Revista de Administração Pública	25	21
Revista de Gestão da Tecnologia e Sistemas de Informação	5	4
Revista de Gestão e Projetos	13	10
Revista Eletrônica de Administração	18	14
Revista Eletrônica de Gestão Organizacional	11	7
Revista Gestão e Tecnologia	18	18
Revista Gestão Industrial	53	44
Revista Pensamento Contemporâneo em Administração	5	4
Total	**664**	**534**

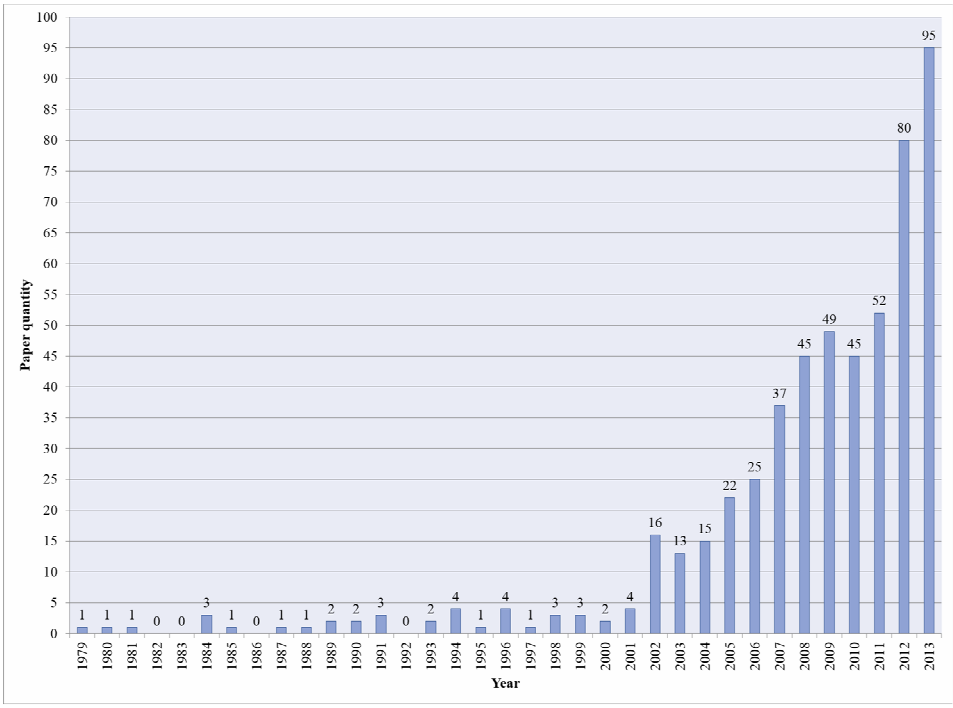

Figure 1 – Number of publications (1979-2013)

One of the analyses made regards innovation level approached by each paper. From the bibliographical portfolio, only 28% of papers conduct this type of categories. Within papers that specify innovation level, it is possible to state that most of them consider incremental innovation (133 papers), followed by radical innovation and a less significant amount of papers regarding semi-radical innovation (119 papers). Three hundred eighty three papers did not specify the type of innovation and three dealt with semi0radical innovation. Noteworthy that in case of more than one level of innovation considered by authors, the counting was considered for both levels.

Regarding innovation level, the majority of papers does not mention innovation level addressed in research. This might occur due to authors willing to discuss innovation in a broader approach than only innovation level. Furthermore, classification or reference to innovation levels are in the background, because many papers are more concerned with innovation management, organizational culture of innovative companies, innovative models, etc. Thus, few papers demonstrate in fact what innovation level was explored and how they were conducted.

Table 2 illustrates innovation level characterization according to each journal. One can see that most papers did not specify innovation level. It is worth mentioning, however, that in those papers that classified innovation level, incremental innovation was the one with more occurrences. By comparing all journals, *Revista de Administração e Inovação* (RAI) is the one that have more papers classifying innovation level – which can suggest a better concern about this, comparing with other journals' papers. In addition, this also suggests that, for sure, it is a peculiar feature from the community publishing in RAI journal, whose expertise in fact is studying innovation subject.

During the analyses, another point observed is related to the historical moment in which these classifications regarding innovation level began to gain attention. The first time that this classification was adopted was in the mid-1990s. In this period, only radical and incremental innovations were addressed. These first publications, in turn, occurred in the same period in

which Oslo's Manual was published – document in which these classifications are clearly exposed. Using categorization as radical and incremental innovation has grown over time, in a similar way for both cases.

Finally, the only papers found that consider semi-radical innovation are from 2012 and 2013: Jaeger Neto et al. (2013); Nisiyama and Oyadomari (2012); Silva et al. (2013). Therefore, one can see that semi-radical innovation is still poorly addressed, or Brazilian authors give little importance to this typology. This can be an opportunity for future studies, or even question the relevance of this classification.

It was also verified innovation typologies mentioned by papers. From the 534 analyzed papers, 37% do not specify innovation type explored. In those articles that classify it, the majority of them focuses on product innovation (257 papers), followed by process innovation (141 papers), organizational innovation (105 papers), and finally, marketing innovation (29 papers).

Table 3 shows the characterization of innovation typology identified in each analyzed journal. We can observe that many papers do not classify innovation typology considered in their respective studies (37%). However, in the sample that classified innovation type, product innovation was the most highlighted. In addition, RAI was again the journal with most papers categorizing innovation typology.

Furthermore, one can observed that marketing innovation calls for further studies to better understand this innovation approach and mostly present how innovations can be conducted in this specific aspect. In addition, it was possible to identify another innovation typology: social innovation (Brunstein et al., 2008; Rodrigues et al., 2012). It is noteworthy that some of the papers that do not determine the type of innovation to which they relate, describe innovation in general, or even innovation management process, which is a topic often seen in analysed studies.

Analogous to the analysis about innovation levels addressed by papers over time, innovation types mentioned in each of the studies were analysed. First publications have adopted some classification regarding innovation were published in the late 1970s. However, until the mid-1990s, only product and process innovation typologies were noticed in publications. After half of the 1990s other classification emerged, which is organisational innovation. This rise coincides with the publication of Oslo's Manual, that brings the concept of this type of innovation.

Innovation in marketing, in turn, arises only in publications from 2003. However, marketing innovation is still quite scarce. What can be seen, though, is that the use of this classification have increased over time. Furthermore, it can be observed that most of the studies is concerned with product innovation, followed by process innovation. It is then possible to verify an opportunity for studies regarding organisational innovation and, especially, marketing innovation. The studies on marketing innovation, although they have grown in recent years, are still very limited if compared to other innovation typologies.

Another point to note is that 71% of the analysed articles were developed on an empirical basis. However, results of these surveys are often not applicable to the reality of many companies, which means that in practice, few companies are able to use these publications and studies to assist them in adding value to their business through innovation. Some of these studies, though with an empirical basis, are shallow, because many times it is only a simple interview into a single company. Furthermore, some of these papers do not even mention how research was conducted, which brings serious questions about the rigour used for conducting these studies. Therefore, question regarding veracity of the findings can be made.

Finally, Table 4 exposes a summarised research agenda about gaps and opportunities for future studies on innovation in Brazil. Next section presents conclusions from this study as well as opportunities for future work obtained.

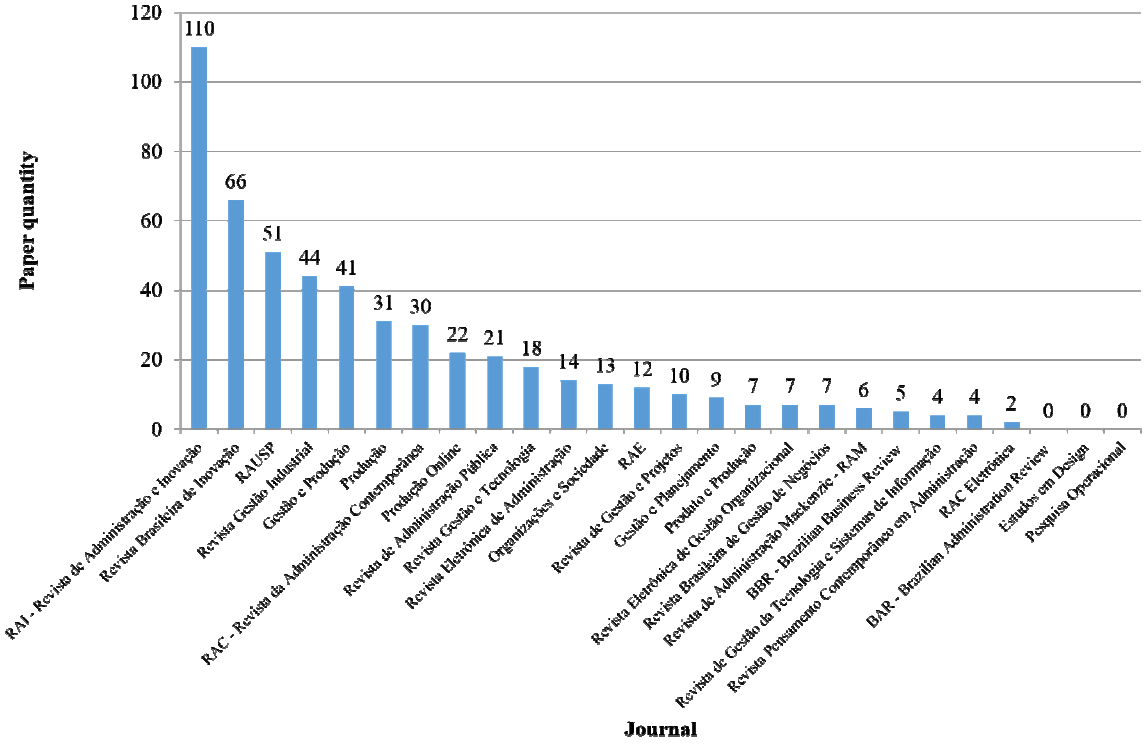

Figure 2 – Number of published papers in each journal

Table 2 – Innovation level by journal

Journals	Radical	Semi-radical	Incremental
BBR - Brazilian Business Review	1	0	3
Gestão e Planejamento	2	0	2
Gestão e Produção	7	1	7
Organizações e Sociedade	3	0	3
Produção	9	0	9
Produção Online	4	0	5
Produto e Produção	4	0	2
RAC - Revista da Administração Contemporânea	6	0	7
RAC Eletrônica	0	0	0
RAE – Revista de Administração de Empresas	3	0	1
RAI - Revista de Administração e Inovação	31	1	36
RAUSP	5	0	4
Revista Brasileira de Gestão de Negócios	2	0	3
Revista Brasileira de Inovação	13	0	19
Revista de Administração Mackenzie – RAM	3	0	3

Table 3 – Innovation level by journal - continued

Journals	Radical	Semi-radical	Incremental
Revista de Administração Pública	2	0	4
Revista de Gestão da Tecnologia e Sistemas de Informação	0	0	0
Revista de Gestão e Projetos	5	0	3
Revista Eletrônica de Administração	3	0	3
Revista Eletrônica de Gestão Organizacional	0	0	0
Revista Gestão e Tecnologia	6	1	7
Revista Gestão Industrial	10	0	12
Revista Pensamento Contemporâneo em Administração	0	0	0
Total	**119**	**3**	**133**

Table 4 – Innovation types by journal

Journals	Product	Process	Marketing	Organizational
BBR – Brazilian Business Review	3	0	0	3
Gestão e Planejamento	5	3	1	4
Gestão e Produção	18	7	1	6
Organizações e Sociedade	5	4	0	4
Produção	22	5	2	6
Produção Online	10	9	0	4
Produto e Produção	7	0	0	0
RAC - Revista da Administração Contemporânea	17	9	1	3
RAC Eletrônica	2	0	0	0
RAE – Revista de Administração de Empresas	4	1	1	5
RAI - Revista de Administração e Inovação	63	36	8	24
RAUSP	15	6	1	2
Revista Brasileira de Gestão de Negócios	2	2	1	2
Revista Brasileira de Inovação	25	19	1	5
Revista de Administração Mackenzie – RAM	3	1	0	0
Revista de Administração Pública	6	5	2	6
Revista de Gestão da Tecnologia e Sistemas de Informação	2	0	0	2
Revista de Gestão e Projetos	9	4	2	2
Revista Eletrônica de Administração	3	4	1	6
Revista Eletrônica de Gestão Organizacional	0	1	0	1
Revista Gestão e Tecnologia	11	7	2	5
Revista Gestão Industrial	22	14	3	14
Revista Pensamento Contemporâneo em Administração	2	1	1	1
Total	**256**	**138**	**28**	**105**

Table 5 – Research agenda on innovation based on the publications in an emerging economy

Opportunity	Innovation type
Studies focused on organizational innovation in Brazilian companies	Organizational
Studies focused on marketing innovation in Brazilian companies	Marketing
Analysis of innovation practices and their benefits in non-conventional sectors	Product, process, organizational, marketing
Analysis of why semi-radical innovation it is few considered by Brazilian researchers	Product, process, organisational, marketing
Analysis of potentialities and barriers to innovation in Brazilian context, comparing to another emerging markets (e.g. China, Russia, South Africa) and/or developed countries (e.g. Germany, USA, Japan)	Product, process, organizational, marketing
Literature analysis comparing innovation practices and context in Brazil and another emerging countries and/or developed countries	Product, process, organizational, marketing
Identify and analyze innovation practices without technological focus	Organizational, marketing

Conclusions

From this study, one can state that the interest on innovation topic has been increasing during the time, mainly from 2000s. This growth can be explained by the need to present benefits that companies can have bringing innovation to an organizational context. In addition, most papers that classify innovation typologies explore product and process innovation, followed by organizational innovation. This innovation typology (organizational), although not well known, has brought relevant contributions regarding businesses models that are encouraging innovation as a competitive advantage to organizations. On the other hand, few papers deal with marketing innovation, which might be an opportunity for future research. Moreover, it was possible to analyze that although innovation concept has been expanded, a predominance of papers regarding technological innovation remains, i.e. even with the emerging of new concepts such as organizational and marketing innovation, researchers in Brazil still prefer to approach innovation specifically in terms of technological features. In this sense, it would be interesting if authors give more attention to managerial aspects of companies that might contribute to enhance innovation in Brazilian industry and service sectors.

With respect to innovation levels, few papers highlighted semi-radical innovation. Hence, an interesting further analysis is verify if semi-radical innovation is not a topic of much interest by researchers and/or this innovation level is still in an embryonic stage. It is noteworthy that this study had also the purpose of guiding future research on innovation in Brazil. Studies that advance specifically in each innovation typology can be relevant in terms of identifying whether there are any patterns or similarities separately among the types of innovation.

Acknowledgments

Authors thank CAPES as well as CNPq, both Brazilian government agencies for research support, for providing grants and financial support.

References

Adler, M.J. (1947). *The Art of Reading*. AGIR Editora, Rio de Janeiro (in Portuguese).

Barraza, M. F. S. (2013). Process Innovation in Local Governments: an empirical study of continuous improvement effort. *Revista Brasileira de Gestão de Negócios*, 47(15): 204-220 (in Spanish).

Bessant, J. and Tidd, J. 2009. *Innovation and Entrepreneurship*. Bookman, Porto Alegre (in Portuguese).

Biancolino, C.A.; Maccari, E.A. and Pereira, M.F. 2013. Innovation as a Tool for Generating Value in the IT Services Sector. *Review of Business Management*, 15(48): 410-426.

Brunstein, J., Rodrigies, A.L. and Kirshbaum, C. 2008. Social Innovation and Institutional Entrepreneurship: the action of "Ação Educativa". *Organizações e Sociedade*, 15(46): 119-136 (in Portuguese).

Cooper, R., Edgett, S. and Kleinschmidt, E. 2001. Portfolio management for new product development: results of a industry practice study. *R&D Management*, 31(4): pp. 361-379.

Crossan, M.M. & Apaydin, M. 2010. A Multi-Dimensional Framework of Organizational Innovation: A Systematic Review of the Literature. *Journal of Management Studies*, 47(6): 1154-1191.

Davila, T., Epstein, M.J. and Shelton, R. 2007. *The Rules of Innovation*. Bookman, Porto Alegre (in Portuguese).

Dess, G.G. and Picken, J.C. 2000. Changing roles: leadership in the 21st century. *Orga,nizational Dynamics*, 28(3): 18-33.

Galhardi, A. C. and Zacarelli, S.B. 2005. Innovation and tecvhnological immitation as a competitive strategy. *Revista Brasileira de Gestão de Negócios*, 17(7): 23-29 (in Portuguese).

Goffin, K. and Mitchell, R. 2010. *Innovation Management: Strategy and Implementation using the Pentathlon Framework*. Palgrave Macmillan, London.

Jaeger Neto, J.I., Luciano, E.M. and Testa, M.G. 2013. Identifying innovation potential in organizations through analysis of the information technology project portfolio. *Gestão & Produção*, 20(3): 495-510 (in Portuguese).

Kubota, F.I. and Cauchick Miguel, P.A. 2013. Analysis of publications on innovation in journals of operations management in Brazil. *Revista GEINTEC*, 4(2): 764-779.

Mone, M.A., Mckinley, W. and Barker, V.L. 1998. Organizational decline and innovation: a contingency framework. *Academy of Management Review*, 23(1): 115-132.

Nascimento, P.T.S., Oih Yu, A.S. and Sobral, M.C. (2008). Low income product innovation. *Revista de Administração Contemporânea*, 12(4): 907-930 (in Portuguese).

Nisiyama, E.K. and Oyadomari, J.C.T. 2012. Management control systems and the innovation process. *Revista de Administração e Inovação*, 9(1): 106–125 (in Portuguese).

Oslo's Manual (1997). *Manual de Oslo: Diretrizes para coleta e interpretação de dados sobre inovação*. 3rd Ed. N/D: OCDE & Eurostat (in Portuguese).

Rodrigues, A.L., Kozonoi, N. and Arruda, F.A.M. 2012 Social organizations: a case study about limits and possibilities of social inovation. *Revista Eletrônica de Gestão Organizacional*, 10(2): 344–368 (in Portuguese).

Schumpeter, J.A. 1982. *Theory of Economic Development*. Abril Cultural, São Paulo (in Portuguese).

Silva, B.E., Neves, J.T.R., Vasconcelos, M.C.R.L. and Araújo, C.A.A. 2013. Contributions of open innovation for a Communication Company. *Revista Gestão & Tecnologia*, 13(2): 222–246 (in Portuguese).

Tushman, M.L. and O'Reilly, C.A. 1996. Ambidextrous organizations: managing evolutionary and revolutionary change. *California Management Review*, 38(4): 8-30.